

The purpose of the Alternative Development Scenarios chapter is to document how a set of scenarios were created for envisioning a more transit-oriented development pattern in the Inner Katy study area. A key step in this process was a very successful, “hands on” public workshop that enabled area residents and interests to provide direct input into the potential future location of new housing and non-residential development relative to possible transit alignments and station locations. The consultant team then refined four alternative scenarios based on the workshop results. The procedures and outcomes of both the workshop and consultant design efforts are outlined in this chapter. As a precursor to the feasibility analysis in Chapter 6 and the preferred scenario conclusions in Chapter 7, this chapter also includes initial evaluation of the various scenarios in terms of the transit-supportive nature of the land use configurations, pedestrian “friendliness,” and other important indicators of TOD success.

Chapter Highlights

- ◆ Building upon the results of a special public workshop held on July 18, 2002, the consultant team refined four alternative development scenarios for Inner Katy, two for Alignment B and two for Alignment C.
- ◆ For each alignment, one scenario depicted more conservative redevelopment expectations while the second scenario explored higher development densities and greater mixing of land uses.
- ◆ Workshop participants generally wanted more transit stops (eight on average, spaced less than one mile apart) than would be desirable assuming that speed rather than more frequent access is the key to maximizing ridership. The consultant-refined scenarios retain only six or seven stops.
- ◆ All the work groups embraced basic TOD principles by concentrating higher-density development around transit stations and along the alignments, with building scale and mixing of uses gradually tapering off farther from the stations. The only place where significant redevelopment was placed more than a mile from transit was to the northwest, where some envisioned a significant employment node in what is now a predominately industrial area just inside Loop 610 and north of the Katy Freeway.
- ◆ All groups also emphasized neighborhood stability, desiring to preserve existing single-family neighborhoods such as the Heights by clustering jobs, higher-density housing and services around transit stations.
- ◆ Several scenarios (B-1 and B-2) include a conceptual greenway linkage over the Katy Freeway to provide access between Memorial Park and redeveloping areas to the north.
- ◆ One scenario (B-2) includes a White Oak Bayou greenway, conducive for longer-distance walking and biking and accented by “gateway” plazas and civic spaces wherever transit stations are near the bayou. Several other scenarios feature “park blocks” in which a pleasant corridor of green space, such as between Durham and Shepherd or Yale and Heights, is lined with small-scale retail shops or higher-rise residential buildings.

- ◆ Fewer transit stations along Alignment C are able to attract high-density mixed-use development, so scenarios C-1 and C-2 focus more on residential redevelopment opportunities, including “live/work” units.
- ◆ More detailed evaluation of the four development scenarios using the PLACE3S model revealed that Alignment B shows the greatest redevelopment impact in terms of acreage. Scenario B-2 ranks highest for new households, and Alignment B also has the clear advantage over C in generating new employment.
- ◆ Among the four alternatives, Scenario B-2 achieves the highest projected total property valuation, surpassing the \$2 billion mark after redevelopment.
- ◆ In three of the four scenarios (excluding Scenario B-2), more than half of the total property valuation is within the ¼-mile range of transit stops, which is a clear indicator of successful transit-oriented development.
- ◆ Scenario B-1 shows the highest number of acres redeveloping within the quarter-mile station vicinities, and it also generates the most employment near stations.
- ◆ The strong residential focus of Scenario C-2 earns this alternative the highest ranking in terms of household growth, although all four scenarios are relatively close in the number of new households drawn to station areas (ranging from 7,500 to 9,500 total households).
- ◆ Using a Pedestrian Activity Index that estimates increased pedestrian trips in transit station areas compared to typical walking behavior, the two Alignment C scenarios ranked highest, primarily because the Washington Avenue corridor is surrounded by a more interconnected street pattern than Alignment B.
- ◆ Significantly, all four scenarios show a marked impact on walking behavior from the introduction of high-capacity transit into the area (ranging from a 152 percent increase in station-area walking trips in Scenario B-1 to 182 percent in Scenario C-2).
- ◆ When the various scenario evaluation factors were combined, the second scenarios for both Alignments B and C ranked highest in terms of their transit supportiveness, creating appealing “places” and promoting walking. As a result, scenarios B-2 and C-2 became the focus of the remainder of the study, eventually leading to the selection of a final preferred TOD scenario for Inner Katy in Chapter 7.

Further detail on these and other results of the Alternative Development Scenarios phase of the study are presented in the remainder of this chapter.

Development Scenarios Workshop

On July 18, 2002, the City of Houston Planning and Development Department hosted an Inner Katy Development Scenarios Workshop at Love Park Community Center (1000 W. 12th Street). The purpose was to involve area residents and

stakeholders in sketching out the possible future design of their community centered on potential high-capacity transit alignments through the area. This exercise forced workshop participants to consider the types of land use changes that would need to happen for transit to be successful in Inner Katy.

Working in small groups, with several focused on Alignment B and several others on Alignment C, the workshop participants first had to decide on the possible location of transit stations. Next, they had to choose areas they deemed appropriate for various types of residential development and retail shops, offices and service establishments as well as public facilities, parks and amenities such as plazas and fountains. While the workshop was designed to encourage everyone to think freely and be creative, participants also had to keep feasibility considerations in the back of their minds. The resulting workshop maps were used as a foundation for the four development scenario options included later in this chapter. Further details on the workshop procedure are included in the Appendix to this chapter.



Workshop participants worked in small groups to achieve consensus on a desired development pattern that would support high-capacity transit

Refinement of Alternative TOD Scenarios

Following the public workshop, the consultant team began to refine alternative transit-oriented development (TOD) scenarios for Inner Katy based on the working maps and comments compiled from the workshop participants. The sketch maps which the small groups had completed for Alignments B and C were analyzed independently. The consultant team then produced four scenario maps, two for each alignment, that integrated the work of all the small groups. As a result, the four alternative concept maps reflect the majority consensus of workshop participants regarding transit station locations and associated land use patterns. Presented in **Figures 5.1** and **5.2** are the two scenarios for Alignment B. The two alternatives for Alignment C are displayed in **Figures 5.3** and **5.4**.

In refining the conceptual designs, the consultant team began with the workshop results but also took into account existing land use, redevelopment feasibility, and compatibility with surrounding neighborhoods. For both alignments, Scenario 1 is considered the more “conservative” scenario because it involves lower development density than Scenario 2. The Scenario 2 maps also reflect greater mixing of land uses.

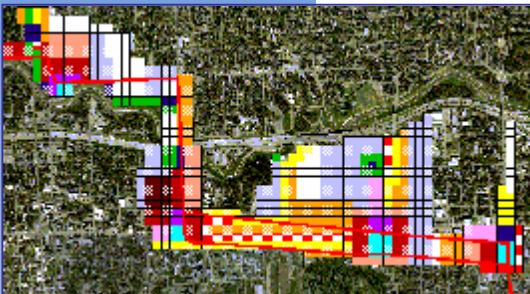
“Conceptual” is the key word applying to all four scenarios. The scenarios should be viewed as planning tools to help determine which potential high-capacity transit alignment is more appropriate, what potential station locations would do the most to encourage redevelopment, and which combination of transit alignment and land

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use mix would generate the most transit ridership, promote pedestrian activity, and enhance the neighborhood.

Key Features of TOD Scenarios

While the groups each pursued a slightly different arrangement of transit stations and land uses, several common themes emerged from the workshop exercise:



The above maps show the progression from workshop sketch map (top) to preliminary land use concept (middle) to conceptual TOD design (bottom). In the middle step, GIS was used to overlay a grid over the base map and allocate land uses and transit stations to specific locations along the alignments.

More Stations

- ◆ Participants wanted a large number of stations along the Inner Katy alignments. On average, the groups placed eight stations on each alignment, spaced an average of less than one mile apart.
- ◆ While more stations might increase ridership originating from within Inner Katy, this would also slow travel times and reduce effectiveness in attracting riders to the west of Inner Katy.
- ◆ The consultant-refined scenarios retain only six or seven stations on each alignment to support the viability of high-capacity transit from a more system-level perspective. However, all of the basic station locations identified by the various workshop groups are still represented among the four scenarios.

Concentrated Development

- ◆ All the work groups focused development around transit stations and along the transit alignments, following the basic TOD principles outlined by the consultant team in the opening presentation to the workshop. Few land use chips were placed more than one-half to one mile from the prospective transit alignments, with the exception of the current industrial area in the northwest part of the study area.
- ◆ Land use near the transit alignments tended to be substantially more dense than existing development in the study area.
- ◆ All groups expressed the desire, both on their sketch maps and through their workshop presentations, to preserve existing single-family neighborhoods such as the Heights by focusing transit-oriented development close to the alignments. High- and medium-density development was concentrated around transit stations while areas beyond the transit nodes remained primarily residential. All four of the refined scenarios reflect this vision of maintaining neighborhood stability where possible while clustering jobs, higher-density housing and daily services around transit stations.

Drawing from the ideas and preferences of the workshop participants, the four scenarios suggest a new kind of urban living in the Inner Katy area, with high-capacity transit serving as the catalyst for change. The experience of other cities with “mature” transit systems and similar urban settings shows that Inner Katy could become a place where residents can work, shop and play all within walking distance of their homes. In transit-oriented districts:

- ◆ more walkable residential neighborhoods, pedestrian shopping districts and civic plazas create a vibrant community that draws residents and transit riders;
- ◆ pedestrian connections are made from mixed-use development at transit stations to local focal points of community activity;
- ◆ streets are improved with the pedestrian in mind;
- ◆ children can walk to school or a nearby pool on a hot summer day;
- ◆ cross walks and landscaped islands provide improved safety for pedestrians while encouraging drivers to slow down; and,
- ◆ street trees shade pedestrians as they walk along new and augmented main streets to neighborhood businesses.



In other cities, high-capacity transit corridors have attracted more dense development and mixing of complementary uses, such as mid-rise residential above ground-floor retail

Alignment B – Scenario 1

As noted earlier, the first scenario for each alignment is the more conservative of the two in terms of development density and land use mix. In this case, for Alignment B, Scenario 1 also reflects liberties that some workshop participants took with this potential transit alignment. To the north of the Katy Freeway, the alignment was moved away from the 7th Street corridor near Shepherd-Durham and redirected to White Oak Drive (6th Street) until reaching the north-south segment at Yale. To the south of the freeway, the two-direction alignment was split, keeping the westbound side on Washington Avenue while shifting the eastbound portion north to Center Street. The split alignment would address concerns about accommodating high-capacity transit along the Washington Avenue corridor without sacrificing any of the four existing traffic lanes (it was estimated that, at minimum, 93 feet of right of way would be needed for two light rail tracks plus four lanes of traffic, yet much of Washington Avenue currently has a 70-foot right of way). The split alignment would also enable high-capacity transit to impact a wider area. For example, Washington and Center are envisioned as main streets in this scenario, complete with street trees, plazas, people and activity.

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Other features of Scenario B-1 include:

- ◆ A high concentration of employment, both around transit stations and in what is now a heavy industrial area in the northwest part of Inner Katy.
- ◆ A significant employment center in this northwest area, just inside Loop 610 and north of the Katy Freeway, that is developed primarily with office and light industrial space and has supporting commercial and open space. Under this scenario, workers could spend their breaks sitting at a local café, window shopping or walking through the park. Transit stations with adjacent mixed-use retail and residential are on both sides of the proposed employment center.
- ◆ Plazas, fountains and other civic spaces sprinkled across the study area, with most civic spaces bordered by parks and green spaces.
- ◆ A proposed greenway that would overcome the barrier imposed by the Katy Freeway corridor and link the employment center in the northwest with Memorial Park. The greenway would consist of a trail flanked by trees, benches and pocket parks.



Alignment B – Scenario 2

The second scenario for Alignment B works around the standard alignment as opposed to the modified transit alignment used in Scenario 1. This scenario includes an assortment of high-rise mixed-use centers around stations, strands of pedestrian shopping, plazas, and a waterfront park. Particular features of Scenario B-2 include:

- ◆ A total of six transit stops, with each surrounded by high-density development. The station-area development consists of a mixture of high-rise office and residential buildings with ground-floor retail.
- ◆ Densities gradually decrease farther from the transit stations. Mixed-use buildings with ground-level retail ultimately give way to entirely residential development.
- ◆ A White Oak Bayou greenway that would allow residents to walk or bike longer distances within Inner Katy in an attractive, off-street setting. The trail would provide needed open space while preserving more green space along the



bayou. A number of plazas and civic spaces would act as gateways to the greenway where it meets transit stations and adjacent development.

Alignment C – Scenario 1

Alignment C begins and ends in areas with strong redevelopment potential. However, the majority of sites in between, from Yale to the Katy Freeway crossing at Westcott, have only moderate redevelopment potential. As a result, Scenario 1 for Alignment C shows primarily low-density residential development, such as townhouses and “live/work” units. Live/work units provide a unique opportunity for residents to work at home but still give their business outside exposure. Most live/work units consist of a storefront-type façade on the first level with living space above. These units can also create a walkable shopping district where only low densities are feasible.

Other features of Scenario C-1 include:

- ◆ Fewer transit stations than along Alignment B that are able to attract high-density mixed-use development. Still, Alignment C transit stations are often surrounded by a mix of residential, retail, office and civic uses that help to create a vibrant walkable community.
- ◆ “Park blocks” along Durham and Shepherd as well as Yale and Heights Boulevard. The Durham/Shepherd park block design is comprised of a corridor of green space between the two streets, with small-scale retail shops lining both edges of the corridor. The Yale/Heights park blocks result in a higher-density area with the same center green corridor, dotted with civic spaces such as fountains and plazas. High-rise residential buildings with ground-floor retail would border the west side of Yale. Park blocks create a pleasant, cool environment for walking, playing or relaxing.

Alignment C – Scenario 2

A variety of open space options are explored in the second scenario for Alignment C. Open space is an essential element of good urban design. Parks and open spaces are good for the environment because they provide shade and wildlife habitat and help reduce pollution. People also need open spaces for recreation and peace of mind. Civic



**Typical live/work units
within easy walking
distance of a nearby
transit station**



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spaces encircled by small parks, park blocks and green corridors can create a series of accessible open spaces in an otherwise dense urban setting.

Other features of Scenario C-2 include:

- ◆ A total of seven transit stations approximately one mile apart. This spacing allows development along the entire corridor.
- ◆ Stations surrounded by high-density TODs with strong mixed-use cores. Medium-density residential development is farther from the transit line.



The major land use differences between the Alignment B and C scenarios are mainly a result of geographic and real estate characteristics. Alignment B has slightly more adjacent redevelopable area. It also has more opportunities for green space

along the alignment due to its close proximity to White Oak Bayou and associated floodplain with reduced development value. Alignment C's prime redevelopable areas tend to be of higher value and therefore have greater redevelopment potential for high-density development. Alignment C is also more heavily residential than B, with no light industrial proposed and offices concentrated around transit stops.

Scenario Analysis

After preparing the four scenarios, the consultant team then analyzed and ranked each alternative according to the following indicators of success:

- ◆ Potential for overall redevelopment in the Inner Katy study area.
- ◆ Potential for enhanced property value.
- ◆ Potential for transit-oriented development, or redevelopment within walking distance of transit.
- ◆ Likelihood of increased future pedestrian activity.
- ◆ Neighborhood compatibility considerations.
- ◆ Overall ability to encourage transit ridership.

Redevelopment Implications

The PLACE³S model that was used for the Baseline Opportunities Analysis in Chapter 4 was again employed to compare the four conceptual development scenarios. The quantity of new households and employment generated in each scenario, and the total acres of redevelopment activity each alternative involves, are displayed in **Table 5.1**. The Alignment B alternatives clearly show the greatest redevelopment impact in terms of acreage. The four scenarios are also ranked

according to the gain in new households and employees. The highest ranking in both instances goes to one of the two Alignment B scenarios, with Alignment B showing a particular advantage over Alignment C in the amount of employment generated. For new households, Scenario 2 for Alignment C was ranked second, but this reflects the extent of residential redevelopment involved in that scenario as discussed earlier.

**TABLE 5.1:
New Households and Employment by Development Scenario**

	Scenario	New Households	Rank	New Employees	Rank	Acres Redeveloped
Alignment B	1	18,307	3	9,703	1	687
	2	28,393	1	6,087	2	638
Alignment C	1	12,638	4	2,435	4	324
	2	20,224	2	4,450	3	493

The refined version of each scenario was intended to illustrate a land use pattern estimated to be profitable for the private sector to develop. Without this condition, the scenarios would not represent a realistic future. However, redevelopment is not appropriate throughout the entire Inner Katy study area. Indeed, most of the workshop participants recommended maintaining the stability of the Heights area and the residential land near Memorial Park. As a result, none of the scenarios indicate significant development activity in existing predominantly single-family residential areas. Instead, the scenarios locate future growth and redevelopment where change was most desired by workshop participants. Measuring overall redevelopment activity is just one indication of a scenario's success.

Next, PLACE³S was used to estimate the overall property valuation that would result from the redevelopment envisioned under each scenario. These results are displayed in **Table 5.2**. Once again, the Alignment B alternatives reflect the highest economic benefits, both area-wide and within the immediate area of proposed transit stations, which is the hallmark of transit-oriented development. In three of the four scenarios (excluding Scenario B-2), more than half of the total property valuation is within the ¼-mile range of transit stops. Enhanced property tax revenue for the city would also mean benefits for local residents and businesses in the form of increased economic activity and investment in Inner Katy.

**TABLE 5.2:
Estimated Appraised Property Value After Redevelopment**

	Scenario	Entire Alignment	Within 1/4 Mile of Transit Stations
Alignment B	1	\$1,631,086,519	\$835,354,255
	2	\$2,075,718,576	\$788,514,572
Alignment C	1	\$912,075,619	\$531,239,778
	2	\$1,488,352,698	\$769,045,066

Potential for Transit-Oriented Development

Development within one-quarter mile of a transit station has a much more significant impact on boosting transit ridership than development farther away (development within one-half mile is also important but tends to be less supportive of transit use). Therefore, the ability of each scenario to encourage redevelopment within the ¼-mile vicinity of proposed transit stations is a vital consideration for the success of high-capacity transit in Inner Katy.

Presented in **Table 5.3** are the results of using the PLACE³S model to quantify the potential new housing and employment that would occur in the critical areas around transit stations under each scenario. The strong residential focus of Scenario C-2 earns this alternative the highest ranking in terms of household growth, although all four scenarios are relatively close in the number of new households drawn to station areas. The spread in the numbers is more pronounced for station-area employment, with Scenario B-1 showing the greatest impact near transit stations. Overall, Scenario B-1 also shows the highest number of acres redeveloping within the quarter-mile station buffers. The household growth potential in Scenario C-2 is illustrated graphically in **Figure 5.5**, both for the ¼-mile station areas and corridor-wide. Similarly, **Figure 5.6** shows the location and likely clustering of potential employment growth under Scenario B-1.

**TABLE 5.3:
New Households and Employment Near Transit Stations**

	Scenario	New Households	Rank	New Employees	Rank	Acres Redeveloped
Alignment B	1	8,153	3	5,675	1	333
	2	9,452	2	3,267	2	227
Alignment C	1	7,508	4	1,567	4	187
	2	9,592	1	3,132	3	221

Pedestrian Activity

When residences and commercial destinations are in close proximity, people tend to walk more. In addition, higher-density land use encourages walking. This is intuitive because compact development brings more destinations within walking distance of each other. Research in the Portland metropolitan area analyzed the influence of housing and employment density, the mixture of residential and commercial uses, and the interconnectivity of the street network on people's walking



behavior. The interconnectivity of streets is important because it reduces the average length of a walking trip compared to the same walk on a discontinuous street network. For example, the average length of a trip in a cul-de-sac subdivision is longer than on a connected grid network, which is what exists throughout much of Inner Katy.

This research was applied to Inner Katy to estimate future increases in pedestrian activity within one-quarter mile of each proposed transit station. The results are presented in **Table 5.4**, which shows the percentage increase in walking trips under each of the four development scenarios relative to typical walking behavior in Houston. The two Alignment C scenarios rank higher on this Pedestrian Activity Index because the Washington Avenue corridor is surrounded by an interconnected street pattern whereas Alignment B has relatively limited street connections with adjacent neighborhoods. This transit-supportive aspect of the Washington Avenue corridor is illustrated graphically in **Figure 5.7**, which highlights the number of street intersections per acre across the study area.

**TABLE 5.4:
Increased Pedestrian Activity by Development Scenario**

	Scenario	Average Pedestrian Activity Index	Rank
Alignment B	1	152%	4
	2	157%	3
Alignment C	1	165%	2
	2	182%	1

Significantly, all four scenarios show a marked impact on walking behavior from the introduction of high-capacity transit into the area. The Pedestrian Activity Index results for Scenario C-1 are displayed geographically in **Figure 5.8**.

Cumulative Comparison of Scenarios

Combined in **Table 5.5** are the various factors that were considered in this chapter in evaluating the four alternative development scenarios prepared for Inner Katy. These include the propensity of each scenario to generate redevelopment in the form of new households and employment, the potential clustering of households and employees within a ¼-mile buffer around proposed transit stations, and the degree to which each scenario would promote increased pedestrian activity. The final column on the far right of Table 5.5 provides a calculated average for each scenario based on this combination of factors. The lower the average, the higher rated is the scenario in terms of its potential to support transit through redevelopment activity that creates appealing “places” and promotes walking. The second scenario for both Alignments B and C tied for the highest ranking. In each case, the B-2 and C-2 scenarios involve higher densities and greater mixing of uses than Scenarios B-1 or C-1. As a result, scenarios B-2 and C-2 became the focus of the remainder of the study, eventually leading to the selection of a final preferred TOD scenario for Inner Katy in Chapter 7.

**TABLE 5.5:
Cumulative Comparison of Alternative Development Scenarios**

	Scenario	New Households	New Employees	1/4 mile Households	1/4 mile Employees	Pedestrian Activity	Average Rank
Alignment B	1	3	1	3	1	4	2.4
	2	1	2	2	2	3	2.0
Alignment C	1	4	4	4	4	2	3.6
	2	2	3	1	3	1	2.0

APPENDIX: Development Scenarios Workshop Procedure

The Inner Katy Development Scenarios Workshop began with an opening presentation by the consultant team which highlighted the basic qualities that make a neighborhood pedestrian-friendly and the type and intensity of development that encourages transit use. The workshop participants were then organized at random into teams of 8-10 people, resulting in five small groups. The small groups were given about two hours to craft their development scenario designs, with three of the groups working on designs for Alignment C and two working on Alignment B.

Materials

Each of the teams was given a large base map that provided an aerial photograph of the study area with a proposed high-capacity transit alignment highlighted. To help them with their task, each group also had a map atlas with information about Inner Katy. The atlas included a series of maps that showed:

- ◆ Potential for Redevelopment
- ◆ Current Land Use
- ◆ Current Household and Employment Densities
- ◆ Special Districts
- ◆ Community Facilities
- ◆ Bike Paths

Transit Station Placement

The groups were first asked to indicate desired transit station locations along the potential alignment crossing the Inner Katy corridor. They were given a few guidelines about what makes a transit station successful:

- ◆ Stations encourage development or redevelopment in adjacent areas.
- ◆ Stations placed in close proximity to existing facilities and major destinations have a good chance of attracting riders.
- ◆ More stations = better access to the study area.
- ◆ Fewer stations = shorter trip times.
- ◆ The faster transit is, the better its ability attract riders.

Development Possibilities

The groups next considered a range of colored paper chips that depicted various types of buildings and urban design elements, such as crosswalks and pedestrian amenities, to be used in the TOD design exercise.

Chip types included, among others:

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- ◆ Transit Stations
- ◆ Parks and Open Space
- ◆ Parking Structures
- ◆ Cross Walks
- ◆ Civic Buildings

Commercial buildings chips included:

- ◆ Mixed-Use Buildings (residential or office use over ground-floor retail)
- ◆ Office Buildings
- ◆ Retail Buildings



Chips also represented a range of residential buildings including:

- ◆ Single-Family Homes
- ◆ Townhomes
- ◆ Live/Work Units
- ◆ Condominium/Apartment Buildings of various sizes

Participants used a combination of these chips to build their development vision.

Land Use Experimentation and Consensus

The groups then spent the bulk of their time experimenting with various arrangements of land uses icons on the map, gradually working toward a consensus development scenario. Some of the considerations for chip placement mentioned in the opening presentation included:

- ◆ Higher-density uses put more potential riders within walking distance of transit.
- ◆ Larger or taller buildings tend to be more profitable and are more likely to be built by a private developer.
- ◆ There are underutilized areas, or “opportunity sites,” within Inner Katy. Substantial changes to these sites could encourage more investment and redevelopment in the area.
- ◆ Mixing residential with non-residential uses puts residents close to potential destinations. These short trips can then be made on foot or by bike.

- ◆ Retail on the ground floor of buildings can help encourage walking.

As they completed their work, the groups were also encouraged to add notes or draw other elements on the maps that they would like to see, including land uses and building types that were not available on the chips supplied.

Group Presentations

The workshop ended with each group presenting their map results to the entire assembly. A spokesperson selected by each table of participants explained any specific goals and underlying themes and noted any unique aspects that portrayed the group's vision for Inner Katy.



The workshop teams did not glue down their land use chips until the group had discussed the “pros and cons” of each arrangement